

MBI0034 sequence listing.ST25.txt
SEQUENCE LISTING

<110> Jiang, Cai-Zhong

<120> Method for Modifying Plant Biomass

<130> MBI-0034

<160> 8

<170> PatentIn version 3.0

<210> 1

<211> 974

<212> DNA

<213> Arabidopsis thaliana

<220>

<221> CDS

<222> (62)..(874)

<223> G1073

<400> 1

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Met Glu Leu Asn Arg Ser Glu Ala Asp Glu Ala Lys Ala Glu Thr Thr
1 5 10 15

ccc acc ggt gga gcc acc agc tca gcc aca gcc tct ggc tct tcc tcc 157
Pro Thr Gly Gly Ala Thr Ser Ser Ala Thr Ala Ser Gly Ser Ser Ser
20 25 30

gga cgt cgt cca cgt ggt cgt cct gca ggt tcc aaa aac aaa ccc aaa 205
Gly Arg Arg Pro Arg Gly Arg Pro Ala Gly Ser Lys Asn Lys Pro Lys
35 40 45

cct ccg acg att ata act aga gat agt cct aac gtc ctt aga tca cac 253
Pro Pro Thr Ile Ile Thr Arg Asp Ser Pro Asn Val Leu Arg Ser His
50 55 60

gtt ctt gaa gtc acc tcc ggt tgc gac ata tcc gag gca gtc tcc acc 301
Val Leu Glu Val Thr Ser Gly Ser Asp Ile Ser Glu Ala Val Ser Thr
65 70 75 80

tac gcc act cgt cgc ggc tgc ggc gtt tgc att ata agc ggc acg ggt 349
Tyr Ala Thr Arg Arg Gly Cys Gly Val Cys Ile Ile Ser Gly Thr Gly
85 90 95

gcg gtc act aac gtc acg ata cgg caa cct gcg gct ccg gct ggt gga 397
Ala Val Thr Asn Val Thr Ile Arg Gln Pro Ala Ala Pro Ala Gly Gly
100 105 110

ggt gtg att acc ctg cat ggt cgg ttt gac att ttg tct ttg acc ggt 445
Gly Val Ile Thr Leu His Gly Arg Phe Asp Ile Leu Ser Leu Thr Gly
115 120 125

act gcg ctt cca ccg cct gca cca ccg gga gca gga ggt ttg acg gtg 493

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Tyr	Leu	Ala	Gly	Gly	Gln	Gly	Gln	Val	Val	Gly	Gly	Asn	Val	Ala	Gly		
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tcg	tta	att	gct	tcg	gga	ccg	gta	gtg	ttg	atg	gct	gct	tct	ttt	gca	589	
Ser	Leu	Ile	Ala	Ser	Gly	Pro	Val	Val	Leu	Met	Ala	Ala	Ser	Phe	Ala		
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aac	gca	gtt	tat	gat	agg	tta	ccg	att	gaa	gag	gaa	gaa	acc	cca	ccg	637	
Asn	Ala	Val	Tyr	Asp	Arg	Leu	Pro	Ile	Glu	Glu	Glu	Glu	Thr	Pro	Pro		
			180					185					190				
ccg	aga	acc	acc	ggg	gtg	cag	cag	cag	cag	ccg	gag	gcg	tct	cag	tcg	685	
Pro	Arg	Thr	Thr	Gly	Val	Gln	Gln	Gln	Gln	Pro	Glu	Ala	Ser	Gln	Ser		
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Ser	Glu	Val	Thr	Gly	Ser	Gly	Ala	Gln	Ala	Cys	Glu	Ser	Asn	Leu	Gln		
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Gly	Gly	Asn	Gly	Gly	Gly	Gly	Gly	Val	Ala	Phe	Tyr	Asn	Leu	Gly	Met	Asn	
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atg	aac	aat	ttt	caa	ttc	tcc	ggg	gga	gat	att	tac	ggt	atg	agc	ggc	829	
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Gly	Ser	Gly	Gly	Gly	Gly	Gly	Gly	Gly	Ala	Thr	Arg	Pro	Ala	Phe			
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Gly	Arg	Arg	Pro	Arg	Gly	Arg	Pro	Ala	Gly	Ser	Lys	Asn	Lys	Pro	Lys		
	35						40					45					

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Pro Pro Thr Ile Ile Thr Arg Asp Ser Pro Asn Val Leu Arg Ser His
50 55 60

Val Leu Glu Val Thr Ser Gly Ser Asp Ile Ser Glu Ala Val Ser Thr
65 70 75 80

Tyr Ala Thr Arg Arg Gly Cys Gly Val Cys Ile Ile Ser Gly Thr Gly
85 90 95

Ala Val Thr Asn Val Thr Ile Arg Gln Pro Ala Ala Pro Ala Gly Gly
100 105 110

Gly Val Ile Thr Leu His Gly Arg Phe Asp Ile Leu Ser Leu Thr Gly
115 120 125

Thr Ala Leu Pro Pro Pro Ala Pro Pro Gly Ala Gly Gly Leu Thr Val
130 135 140

Tyr Leu Ala Gly Gly Gln Gly Gln Val Val Gly Gly Asn Val Ala Gly
145 150 155 160

Ser Leu Ile Ala Ser Gly Pro Val Val Leu Met Ala Ala Ser Phe Ala
165 170 175

Asn Ala Val Tyr Asp Arg Leu Pro Ile Glu Glu Glu Glu Thr Pro Pro
180 185 190

Pro Arg Thr Thr Gly Val Gln Gln Gln Gln Pro Glu Ala Ser Gln Ser
195 200 205

Ser Glu Val Thr Gly Ser Gly Ala Gln Ala Cys Glu Ser Asn Leu Gln
210 215 220

Gly Gly Asn Gly Gly Gly Gly Val Ala Phe Tyr Asn Leu Gly Met Asn
225 230 235 240

Met Asn Asn Phe Gln Phe Ser Gly Gly Asp Ile Tyr Gly Met Ser Gly
245 250 255

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<212> DNA

MBI0034 sequence listing.ST25.txt

<213> Arabidopsis thaliana

<220>

<221> CDS

<222> (82)..(879)

<223> G2789

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Met Asp Glu Val Ser Arg Ser His Thr Pro	
1 5 10	
caa ttt cta tca agt gat cat cag cac tat cac cat caa aac gct gga	159
Gln Phe Leu Ser Ser Asp His Gln His Tyr His His Gln Asn Ala Gly	
15 20 25	
cga caa aaa cgc ggc aga gaa gaa gaa gga gtt gaa ccc aac aat ata	207
Arg Gln Lys Arg Gly Arg Glu Glu Glu Gly Val Glu Pro Asn Asn Ile	
30 35 40	
ggg gaa gac cta gcc acc ttt cct tcc gga gaa gag aat atc aag aag	255
Gly Glu Asp Leu Ala Thr Phe Pro Ser Gly Glu Glu Asn Ile Lys Lys	
45 50 55	
aga agg cca cgt ggc aga cct gct ggt tcc aag aac aaa ccc aaa gca	303
Arg Arg Pro Arg Gly Arg Pro Ala Gly Ser Lys Asn Lys Pro Lys Ala	
60 65 70	
cca atc ata gtc act cgc gac tcc gcg aac gcc ttc aga tgt cac gtc	351
Pro Ile Ile Val Thr Arg Asp Ser Ala Asn Ala Phe Arg Cys His Val	
75 80 85 90	
atg gag ata acc aac gcc tgc gat gta atg gaa agc cta gcc gtc ttc	399
Met Glu Ile Thr Asn Ala Cys Asp Val Met Glu Ser Leu Ala Val Phe	
95 100 105	
gct aga cgc cgt cag cgt ggc gtt tgc gtc ttg acc gga aac ggg gcc	447
Ala Arg Arg Arg Gln Arg Gly Val Cys Val Leu Thr Gly Asn Gly Ala	
110 115 120	
gtt aca aac gtc acc gtt aga caa cct ggc gga ggc gtc gtc agt tta	495
Val Thr Asn Val Thr Val Arg Gln Pro Gly Gly Gly Val Val Ser Leu	
125 130 135	
cac gga cgg ttt gag att ctt tct ctc tcg ggt tcg ttt ctt cct cca	543
His Gly Arg Phe Glu Ile Leu Ser Leu Ser Gly Ser Phe Leu Pro Pro	
140 145 150	
ccg gca cca cca gct gcg tct ggt tta aag gtt tac tta gcc ggt ggt	591
Pro Ala Pro Pro Ala Ala Ser Gly Leu Lys Val Tyr Leu Ala Gly Gly	
155 160 165 170	
caa ggt caa gtg atc gga ggc agt gtg gtg gga ccg ctt acg gca tca	639
Gln Gly Gln Val Ile Gly Gly Ser Val Val Gly Pro Leu Thr Ala Ser	
175 180 185	

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agt ccg gtg gtc gtt atg gca gct tca ttt gga aac gca tct tac gag 687
Ser Pro Val Val Val Met Ala Ala Ser Phe Gly Asn Ala Ser Tyr Glu
190 195 200

agg ctg cca cta gag gag gag gag gaa act gaa aga gaa ata gat gga 735
Arg Leu Pro Leu Glu Glu Glu Glu Thr Glu Arg Glu Ile Asp Gly
205 210 215

aac gcg gct agg gcg att gga acg caa acg cag aaa cag tta atg caa 783
Asn Ala Ala Arg Ala Ile Gly Thr Gln Thr Gln Lys Gln Leu Met Gln
220 225 230

gat gcg aca tcg ttt att ggg tcg ccg tcg aat tta att aac tct gtt 831
Asp Ala Thr Ser Phe Ile Gly Ser Pro Ser Asn Leu Ile Asn Ser Val
235 240 245 250

tcg ttg cca ggt gaa gct tat tgg gga acg caa cga ccg tct ttc taa 879
Ser Leu Pro Gly Glu Ala Tyr Trp Gly Thr Gln Arg Pro Ser Phe
255 260 265

gataatatca ttgataatat aagtttcgctc ttcttattct ttttcacttt ttaccttttt 939

cactttctta ggttttgttt taacgtttga ttaataacctg aagggttttg gaaaattttc 999

gatcgataaa aaggatttat gttgcgagcc gaaacgcggc c 1040

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<213> Arabidopsis thaliana

<400> 4

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35 40 45

Phe Pro Ser Gly Glu Glu Asn Ile Lys Lys Arg Arg Pro Arg Gly Arg
50 55 60

Pro Ala Gly Ser Lys Asn Lys Pro Lys Ala Pro Ile Ile Val Thr Arg
65 70 75 80

Asp Ser Ala Asn Ala Phe Arg Cys His Val Met Glu Ile Thr Asn Ala
85 90 95

Cys Asp Val Met Glu Ser Leu Ala Val Phe Ala Arg Arg Arg Gln Arg

100

105

110

Gly Val Cys Val Leu Thr Gly Asn Gly Ala Val Thr Asn Val Thr Val
115 120 125

Arg Gln Pro Gly Gly Gly Val Val Ser Leu His Gly Arg Phe Glu Ile
130 135 140

Leu Ser Leu Ser Gly Ser Phe Leu Pro Pro Pro Ala Pro Pro Ala Ala
145 150 155 160

Ser Gly Leu Lys Val Tyr Leu Ala Gly Gly Gln Gly Gln Val Ile Gly
165 170 175

Gly Ser Val Val Gly Pro Leu Thr Ala Ser Ser Pro Val Val Val Met
180 185 190

Ala Ala Ser Phe Gly Asn Ala Ser Tyr Glu Arg Leu Pro Leu Glu Glu
195 200 205

Glu Glu Glu Thr Glu Arg Glu Ile Asp Gly Asn Ala Ala Arg Ala Ile
210 215 220

Gly Thr Gln Thr Gln Lys Gln Leu Met Gln Asp Ala Thr Ser Phe Ile
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Tyr Trp Gly Thr Gln Arg Pro Ser Phe
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Met Lys Gly Glu Tyr Arg Glu Gln Lys Ser Asn Glu Met Phe	
1 5 10	
tcc aag ctt cct cat cat caa caa caa cag caa caa caa caa caa caa	278
Ser Lys Leu Pro His His Gln Gln Gln Gln Gln Gln Gln Gln Gln	
15 20 25 30	
cac tct ctt acc tct cac ttc cac ctc tcc tcc acc gta acc ccc acc	326
His Ser Leu Thr Ser His Phe His Leu Ser Ser Thr Val Thr Pro Thr	
35 40 45	
gtc gat gac tcc tcc atc gaa gtg gtc cga cgt cca cgt ggc aga cca	374
Val Asp Asp Ser Ser Ile Glu Val Val Arg Arg Pro Arg Gly Arg Pro	
50 55 60	
cca ggt tcc aaa aac aaa cct aaa cca ccc gtc ttc gtc aca cgt gac	422
Pro Gly Ser Lys Asn Lys Pro Lys Pro Pro Val Phe Val Thr Arg Asp	
65 70 75	
acc gac cct cct atg agt cct tac atc ctc gaa gtt cct tca gga aac	470
Thr Asp Pro Pro Met Ser Pro Tyr Ile Leu Glu Val Pro Ser Gly Asn	
80 85 90	
gac gtc gtc gaa gcc atc aac cgt ttc tgc cgc cgt aaa tcc atc gga	518
Asp Val Val Glu Ala Ile Asn Arg Phe Cys Arg Arg Lys Ser Ile Gly	
95 100 105 110	
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Val Cys Val Leu Ser Gly Ser Gly Ser Val Ala Asn Val Thr Leu Arg	
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Gln Pro Ser Pro Ala Ala Leu Gly Ser Thr Ile Thr Phe His Gly Lys	
130 135 140	
ttt gat ctc ctc tcc gtc tcc gca acg ttt ctc cct cct ccg cct cgt	662
Phe Asp Leu Leu Ser Val Ser Ala Thr Phe Leu Pro Pro Pro Arg	
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Thr Ser Leu Ser Pro Pro Val Ser Asn Phe Phe Thr Val Ser Leu Ala	
160 165 170	
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Gly Pro Gln Gly Gln Ile Ile Gly Gly Phe Val Ala Gly Pro Leu Ile	
175 180 185 190	
tcg gca gga aca gtt tac gtc atc gcc gca agt ttc aac aac cct tct	806
Ser Ala Gly Thr Val Tyr Val Ile Ala Ala Ser Phe Asn Asn Pro Ser	
195 200 205	
tat cac cgg tta ccg gcg gaa gaa gag caa aaa cac tcg gcg ggg aca	854
Tyr His Arg Leu Pro Ala Glu Glu Glu Gln Lys His Ser Ala Gly Thr	
210 215 220	
ggg gaa aga gag gga caa tct ccg ccg gtc tct ggt ggc ggt gaa gag	902

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Gly Glu Arg Glu Gly Gln Ser Pro Pro Val Ser Gly Gly Gly Glu Glu
225 230 235

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Ser Gly Gln Met Ala Gly Ser Gly Gly Glu Ser Cys Gly Val Ser Met
240 245 250

tac agt tgc cac atg ggt ggc tct gat gtt att tgg gcc cct aca gcc 998
Tyr Ser Cys His Met Gly Gly Ser Asp Val Ile Trp Ala Pro Thr Ala
255 260 265 270

aga gct cca ccg cca tac taa ccaatccttc tttcacaaat ctctttcttt 1049
Arg Ala Pro Pro Pro Tyr
275

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<213> Arabidopsis thaliana

<400> 6

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20 25 30

Leu Thr Ser His Phe His Leu Ser Ser Thr Val Thr Pro Thr Val Asp
35 40 45

Asp Ser Ser Ile Glu Val Val Arg Arg Pro Arg Gly Arg Pro Pro Gly
50 55 60

Ser Lys Asn Lys Pro Lys Pro Pro Val Phe Val Thr Arg Asp Thr Asp
65 70 75 80

Pro Pro Met Ser Pro Tyr Ile Leu Glu Val Pro Ser Gly Asn Asp Val
85 90 95

Val Glu Ala Ile Asn Arg Phe Cys Arg Arg Lys Ser Ile Gly Val Cys
100 105 110

Val Leu Ser Gly Ser Gly Ser Val Ala Asn Val Thr Leu Arg Gln Pro
115 120 125

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Ser Pro Ala Ala Leu Gly Ser Thr Ile Thr Phe His Gly Lys Phe Asp
130 135 140

Leu Leu Ser Val Ser Ala Thr Phe Leu Pro Pro Pro Pro Arg Thr Ser
145 150 155 160

Leu Ser Pro Pro Val Ser Asn Phe Phe Thr Val Ser Leu Ala Gly Pro
165 170 175

Gln Gly Gln Ile Ile Gly Gly Phe Val Ala Gly Pro Leu Ile Ser Ala
180 185 190

Gly Thr Val Tyr Val Ile Ala Ala Ser Phe Asn Asn Pro Ser Tyr His
195 200 205

Arg Leu Pro Ala Glu Glu Glu Gln Lys His Ser Ala Gly Thr Gly Glu
210 215 220

Arg Glu Gly Gln Ser Pro Pro Val Ser Gly Gly Gly Glu Glu Ser Gly
225 230 235 240

Gln Met Ala Gly Ser Gly Gly Glu Ser Cys Gly Val Ser Met Tyr Ser
245 250 255

Cys His Met Gly Gly Ser Asp Val Ile Trp Ala Pro Thr Ala Arg Ala
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Pro Pro Pro Tyr
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<220>
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<222> (63)..(740)
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Met Leu Ser Lys Leu Pro Thr Gln Arg His Leu His Leu Ser Pro
1 5 10 15

tcc tct ccc tcc atg gaa acc gtc ggg cgt cca cgt ggc aga cct cga 155

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cct	atg	agt	cct	tac	atc	ctc	gaa	gtg	cca	tcc	gga	aac	gat	gtc	gtt	251
Pro	Met	Ser	Pro	Tyr	Ile	Leu	Glu	Val	Pro	Ser	Gly	Asn	Asp	Val	Val	
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gaa	gcc	cta	aac	cgt	ttc	tgc	cgc	ggt	aaa	gcc	atc	ggc	ttt	tgc	gtc	299
Glu	Ala	Leu	Asn	Arg	Phe	Cys	Arg	Gly	Lys	Ala	Ile	Gly	Phe	Cys	Val	
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Leu	Ser	Gly	Ser	Gly	Ser	Val	Ala	Asp	Val	Thr	Leu	Arg	Gln	Pro	Ser	
80					85					90					95	
ccg	gca	gct	cct	ggc	tca	acc	att	act	ttc	cac	gga	aag	ttc	gat	ctt	395
Pro	Ala	Ala	Pro	Gly	Ser	Thr	Ile	Thr	Phe	His	Gly	Lys	Phe	Asp	Leu	
			100						105					110		
ctc	tct	gtc	tcc	gcc	act	ttc	ctc	cct	cct	cta	cct	cct	acc	tcc	ttg	443
Leu	Ser	Val		Ala	Thr	Phe	Leu	Pro	Pro	Leu	Pro	Pro	Thr	Ser	Leu	
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tcc	cct	ccc	gtc	tcc	aat	ttc	ttc	acc	gtc	tct	ctc	gcc	gga	cct	cag	491
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Gly	Lys	Val	Ile	Gly	Gly	Phe	Val	Ala	Gly	Pro	Leu	Val	Ala	Ala	Gly	
	145					150					155					
act	gtt	tac	ttc	gtc	gcc	act	agt	ttc	aag	aac	cct	tcc	tat	cac	cgg	587
Thr	Val	Tyr	Phe	Val	Ala	Thr	Ser	Phe	Lys	Asn	Pro	Ser	Tyr	His	Arg	
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tta	cct	gct	acg	gag	gaa	gag	caa	aga	aac	tcg	gcg	gaa	ggg	gaa	gag	635
Leu	Pro	Ala	Thr	Glu	Glu	Gln	Arg	Asn	Ser	Ala	Glu	Gly	Glu	Glu	Glu	
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gag	gga	caa	tcg	ccg	ccg	gtc	tct	gga	ggt	ggt	gga	gag	tcg	atg	tac	683
Glu	Gly	Gln	Ser	Pro	Pro	Val	Ser	Gly	Gly	Gly	Gly	Glu	Ser	Met	Tyr	
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gtg	ggt	ggc	tct	gat	gtc	att	tgg	gat	ccc	aac	gcc	aaa	gct	cca	tcg	731
Val	Gly	Gly	Ser	Asp	Val	Ile	Trp	Asp	Pro	Asn	Ala	Lys	Ala	Pro	Ser	
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Pro	Tyr															
	225															
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actcactctt	taatctctct	atcacttctt	cttttagcttt	ttctgcagtg	tcaaacttca											900

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 gagattgaat gtataatata atggtttaat 1050

<210> 8
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Met Leu Ser Lys Leu Pro Thr Gln Arg His Leu His Leu Ser Pro Ser
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Ser Pro Ser Met Glu Thr Val Gly Arg Pro Arg Gly Arg Pro Arg Gly
 20 25 30

Ser Lys Asn Lys Pro Lys Ala Pro Ile Phe Val Thr Ile Asp Pro Pro
 35 40 45

Met Ser Pro Tyr Ile Leu Glu Val Pro Ser Gly Asn Asp Val Val Glu
 50 55 60

Ala Leu Asn Arg Phe Cys Arg Gly Lys Ala Ile Gly Phe Cys Val Leu
 65 70 75 80

Ser Gly Ser Gly Ser Val Ala Asp Val Thr Leu Arg Gln Pro Ser Pro
 85 90 95

Ala Ala Pro Gly Ser Thr Ile Thr Phe His Gly Lys Phe Asp Leu Leu
 100 105 110

Ser Val Ser Ala Thr Phe Leu Pro Pro Leu Pro Pro Thr Ser Leu Ser
 115 120 125

Pro Pro Val Ser Asn Phe Phe Thr Val Ser Leu Ala Gly Pro Gln Gly
 130 135 140

Lys Val Ile Gly Gly Phe Val Ala Gly Pro Leu Val Ala Ala Gly Thr
 145 150 155 160

Val Tyr Phe Val Ala Thr Ser Phe Lys Asn Pro Ser Tyr His Arg Leu
 165 170 175

Pro Ala Thr Glu Glu Glu Gln Arg Asn Ser Ala Glu Gly Glu Glu Glu

180

185

190

Gly Gln Ser Pro Pro Val Ser Gly Gly Gly Gly Glu Ser Met Tyr Val
195 200 205

Gly Gly Ser Asp Val Ile Trp Asp Pro Asn Ala Lys Ala Pro Ser Pro
210 215 220

Tyr
225